#14

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

In re Patent Application of

CHRISTOPOULOS et al.

Serial No. 09/394,428

Filed: September 13, 1999

Title: DOWN SCALING OF IMAGES

Atty Dkt. 2466-35
C# M#

Group Art Unit: 2613

Examiner: Behrooz M. Senfi

Date: November 14, 2003

OIPE JC100
NOV 14 2003
PATENT & TRADEMARK OFFICE

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

☐ **Correspondence Address Indication Form Attached.**

☐ **NOTICE OF APPEAL**
Applicant hereby appeals to the Board of Appeals from the decision dated ______________ of the Examiner twice/finally rejecting claims ______________ ($ 330.00) $

☒ An **Reinstated Appeal with an Appeal BRIEF** is attached in triplicate in the pending appeal **No Fee Due.** $

☐ Credit for fees paid in prior appeal without decision on merits -$ ( )

☐ A reply brief is attached in triplicate under Rule 193(b) **(no fee)**

☒ Petition is hereby made to extend the current due date so as to cover the filing date of this paper and attachment(s) (**$110.00/1 month**; $420.00/2 months; **$950.00/3 months**; $1480.00/4 months) $ 110.00

SUBTOTAL $ 110.00

☐ Applicant claims "Small entity" status, enter ½ of subtotal and subtract -$( )
☐ "Small entity" statement attached.

SUBTOTAL $ 110.00

Less month extension previously paid on -$(0.00)

TOTAL FEE ENCLOSED $ 110.00

Any future submission requiring an extension of time is hereby stated to include a petition for such time extension. The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our **Account No. 14-1140.** A duplicate copy of this sheet is attached.

1100 North Glebe Road, 8th Floor
Arlington, Virginia 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100
JRL:at

NIXON & VANDERHYE P.C.
By Atty: John R. Lastova, Reg. No. 33,149

Signature: ______________________

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

CHRISTOPOULOS et al. Atty. Ref.: **2466-35**

Serial No. **09/394,428** Group: **2613**

Filed: **September 13, 1999** Examiner: **B.M. SENFI**

For: **DOWN SCALING OF IMAGES**

Before the Board of Patent Appeals and Interferences

BRIEF FOR APPELLANT

from Group Art Unit 2613

John R. Lastova
NIXON & VANDERHYE P.C.
8th Floor, 1100 North Glebe Road
Arlington, Virginia 22201-4714
(703) 816-4025
Attorney for Appellant
CHRISTOPOULOS et al.
Telefonaktiebolaget LM Ericsson (publ)

TABLE OF CONTENTS

REAL PARTY IN INTEREST 1
RELATED APPEALS AND INTERFERENCES 1
STATUS OF CLAIMS 2
STATUS OF AMENDMENTS 2
SUMMARY OF INVENTION 2
ISSUES 5
GROUPING OF CLAIMS 5
ARGUMENT 5
A. Introduction 5
B. Basis of the Anticipation Rejection 6
C. Lee Fails to Disclose the Features Recited in Claims 2, 11, 14, 16, and 19 6
D. Lee and Zhu Fail To Disclose or Suggest Claims 22, 23, 25, and 26 8
CONCLUSION 11
APPENDIX A A-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

In re Patent Application of

CHRISTOPOULOS et al.

Serial No. 09/394,428

Filed: September 13, 1999

For: DOWN SCALING OF IMAGES

OIPE JC100 NOV 14 2003 PATENT & TRADEMARK OFFICE

Atty. Ref.: 2466-35

Group: 2613

Examiner: Behrooz M. Senfi

November 14, 2003

Honorable Commissioner of Patents
and Trademarks
Washington, DC 20231

APPEAL BRIEF

Sir:

This is an appeal from the Examiner's non-final Rejection dated July 15, 2003.[1]

REAL PARTY IN INTEREST

The real party in interest is the assignee, Telefonaktiebolaget LM Ericsson (publ) of Stockholm, Sweden.

RELATED APPEALS AND INTERFERENCES

There are no other pending appeals related to the subject application. However, a first Appeal Brief was filed on April 25, 2003. The Examiner found the first Brief to be persuasive and withdrew the finality of the action. In the following non-final

---

[1] The claims on appeal appear in Appendix A accompanying this Brief.

action, the Examiner rejected claims 2, 11, 14, 16, 19, 22, 23, 25, and 26 using the same prior art references applied in the appealed final action. There are no interferences related to the subject application.

STATUS OF CLAIMS

Claims 1-4 and 9-26 are pending on this appeal. Claims 5-8 are cancelled. Claims 2, 11, 14, 16, and 19 stand rejected for anticipation based upon U.S. Patent No. 5,107,345 to Lee. Claims 22-23 and 25-26 stand rejected under 35 USC §103 as being unpatentable over Lee in view of U.S. Patent No. 5,870,146 to Zhu. Claims 1, 3, 4, 9, 10, 12, 13, 15, 17, 18, 20, and 21 are allowed. Claim 24 stands objected to as containing allowable subject matter.

STATUS OF AMENDMENTS

No amendment after final or after the most recent non-final rejection has been filed. The Examiner amended claims 11 and 13 by Examiner's amendment after withdrawing the final rejection.

SUMMARY OF INVENTION

When a video signal is transmitted, it is typically compressed, and the receiver decompresses the received signal to reconstruct the video signal. Image compression typically employs three stages: source encoding, quantizing, and entropy encoding. The source encoder is usually a linear transform that distinguishes different frequency components of an image. The Discrete Cosine Transform (DCT) is commonly used. The DCT converts a video signal in the time domain into a signal in the frequency domain to separate the image into parts (spectral sidebands) of differing importance (with respect to the image's visual quality). Image compression standards like JPEG, MPEG-1, MPEG-2, H.261, and H.263 use DCT or block transform-based techniques.

A typical transform coding system divides an input image into fixed block sizes, e.g., 8 x 8 or 16 x 16 pixels. At the transmitter, each block is DCT transformed. For example, an 8 x 8 DCT transforms an 8 x 8 pixel block (8-bits per pixel) into an 8 x 8 DCT coefficient block (64-bits per DCT coefficient). The DCT coefficients may be scaled, e.g., more bits for values corresponding to lower frequencies and fewer bits for values corresponding to higher frequencies.

Transmission of video with different Qualities of Service (QoS) requires different bit rates. Varying traffic load over a communications link or network requires bit rate adaptation to available channel capacity. A "scalable" coding scheme, like DCT-based coding, allows users having a different QoS to communicate with each other, e.g., a subscriber with a lower quality video service can decode and reconstruct a higher quality video signal albeit at the lower QoS level.

Many scalable coding systems require more than one size DCT in order to adapt to different QoS requirements or different capacity constraints. To have this flexibility, different size DCTs must be supported, e.g., 2 x 2, 4 x 4, 8 x 8, 16 x 16 DCTs. In that case, the encoder must be able to perform all of the different size DCTs, and the decoder must be able to handle the different size inverse DCTs (IDCTs). But there are situations where only one size DCT is available, e.g., only 8 x 8 DCTs. Another drawback is that smaller DCTs may not be as efficient as larger DCTs, e.g., 4 x 4 DCTs are not as efficient as 8 x 8 DCTs.

The present invention overcomes the problems associated with using different size DCTs. An N-point DCT is determined using only N/2 DCT transforms. The advantage of this approach is demonstrated in the example context of a digital image transmission system shown in Fig. 1. Different capability users 101, 103, and 15 are connected to each other via an MCU 107. Users 101 and 105 have 128 kbps connections, but user 103 only has a 28.8 kbps connection. If users 101 and 105 transmit video signals in a higher QoS CIF format, user 103 cannot receive that video because of limited

transmission bandwidth unless the MCU performs some kind of bit reduction of the video signal.

One way of obtaining this bit reduction at the MCU is to extract only the 4 x 4 low frequency coefficients of the 8 x 8 DCT coefficients from the incoming video from users 101 and 105 and to transmit only these 4 x 4 low frequency coefficients to user 103. User 103's receiver can then reconstruct the incoming frames in a lower QoS QCIF format through appropriate scaling of the motion vectors. But a better approach is to extract low frequency 8 x 8 DCT coefficients from 16 x 16 blocks of DCT coefficients and calculate the 16 x 16 DCT using sequences from the 8 x 8 DCTs. A 16 x 16 size DCT is not needed.

A DCT of length N/2 is calculated to produce two sequences of coefficients of length N/2, that represent the first and second half, respectively, of an original sequence of values of length N. A DCT of length N is then calculated from the two sequences of coefficients of length N/2. Similarly, a DCT of length N/2 x N/2 is calculated to produce four sequences of coefficients, and a DCT of length N x N is calculated directly from the four sequences of coefficients.

The mathematical explanation how this may be accomplished is set forth starting on page 5, and steps performed in the DCT domain are illustrated in Fig. 5. Fig. 2 illustrates steps for deriving a QCIF image from a CIF image without having to use any other size transforms than 8 x 8 DCTs. Various image compression downsampling applications are described beginning at page 22.

ISSUES

There are two issues presented in this appeal:

- whether Lee teaches each feature of claims 2, 11, 14, 16, and 19.
- whether the Examiner has failed to establish a prima facie case of obviousness of rejected claims 22, 23, 25, and 26.

GROUPING OF CLAIMS

For convenience and not for purposes of limiting the scope of any of the grouped claims, claims 11, 14, 16, and 19 stand or fall with claim 2.

ARGUMENT

A. Introduction

Anticipation requires that each and every limitation of a claim be found in s single prior art reference.[2] If even on limitation is missing, then the reference does not anticipate the claim.[3] The Supreme Court, in the case of *Graham v. John Deere*, 383 US1, 148 USPQ 459 (1966) set forth the necessary factual inquiries to be made in determining the obviousness or non-obviousness of the claims at issue under 35 U.S.C. §103 as follows:

> [u]nder §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are ascertained; the level of ordinary skill in the art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined.

---

[2] *Scripps Clinic & Research Round. v. Genentech, Inc.*, 927 F.2d 1565 (1991).

[3] *Kloster Speedsteel AB v. Crucible, Inc.*, 793 F2d 1565 (Fed. Cir. 1986).

The Examiner has the burden under §102 of demonstrating where each claim feature is found in Lee and under §103 of establishing a *prima facie* case of obviousness.[4] The appealed rejections fail to satisfy their respective burdens.

B. Basis of the Anticipation Rejection

The anticipation rejection is based on Lee. In the final rejection that preceded this non-final action, the Examiner admitted that Lee fails to teach computing an "N x N DCT directly from two sequences of length N/2 x N/2 and also N x N directly from four DCTs of four adjacent blocks." Nonetheless, the Examiner now retracts that admission for claims 2, 11, 14, 16, and 19. In the appealed anticipation rejection, the Examiner focuses on Fig. 1 and 8 x 8 DCT 10b, referring to it as an N/2 x N/2 DCT, and contends that it "produces four sequences of coefficients QC8." The Examiner further contends that the multiplexer 48 in Fig. 2 "reconstructs the DCT of the original N x N from QC8."

C. Lee Fails to Disclose the Features Recited in Claims 2, 11, 14, 16, and 19

Lee describes a method for compressing image data and employs a system for generating from a block of input pixel data a corresponding composite block of DCT data. The system also performs multiple, different size DCTs on different size sub-blocks of the block of pixel data. The DCT transform outputs corresponding blocks and sub-blocks of DCT coefficient values. Lee describes "dynamically treating DCT coefficient blocks…using variable block sizes (sub-blocks), such as 8 x 8 or 4 x 4 and so forth, for the purpose of reducing block artifacts."

In Fig. 1, a 16 x 16 pixel block is divided into:

---

[4] *In re Piasecki*, 223 USPQ 785 (Fed. Cir. 1984).

- 64--2 x 2 blocks. A 2 x 2 DCT for each 2 x 2 block is calculated in 10d.
- 16--4 x 4 blocks. A 4 x 4 DCT for each 4 x 4 block is calculated in 10c.
- 4--8 x 8 blocks. An 8 x 8 DCT for each 8 x 8 block is calculated in 10b.
- 1--16 x 16 block. A 16 x 16 DCT for each 16 x 16 block is calculated in 10a.

Further processing in Figs. 1and 2 selects the most suitable dividing for each incoming pixel block. The output is shown at the far right in Fig. 2.

Lee uses a DCT of dimension N x N for each DCT sub-block calculation. Figure 7 confirms this fact in the first and second flow chart blocks where a 16 x 16 pixel block is transformed "using 2 x 2, 4 x 4, 8 x 8, and 16 x 16 DCT." Lee's 8 x 8 DCT element 10b calculates four 8 x 8 DCTs for the 16 x 16 pixel block to produce four sub-blocks of 8 x 8 DCT coefficients. So in this DCT processing path identified in Lee by the Examiner, N = 8.

Consider the blocks shown in Fig. 2. QC8 is clearly shown as four sub-blocks of 8 x 8 DCT coefficients. Column 9, lines 40-43 state: "[t]he output of quantizer lookup table 12b, indicated by the reference signal QC8, is comprised of a data block of four 8 x 8 sub-blocks of quantized DCT coefficient values." Lee calculates 8 x 8 (i.e., N x N) DCT coefficients from the 8 x 8 sub-blocks obtained from the division of the received 16 x 16 pixel block. Lee does not disclose calculating higher-order DCT coefficients from lower-order DCTs. In other words, Lee does not teach calculating 16 x 16 DCT coefficients from 8 x 8 DCT coefficients.

In contrast, claim 2 describes calculating a DCT of "length N/2 x N/2…to produce four sequences of coefficients" and "calculating a DCT of length N x N directly from the four sequences of coefficients." Lee clearly characterizes the outputs from the 8 x 8 DCT 10b as four "8 x 8 DCT coefficient sub-block[s]." Col. 10, line 13. See also

Lee's claim 1 which recites: "third transform means for receiving and performing 8 x 8 DCT operations on said block of pixel data, and providing a corresponding block of four 8 x 8 DCT coefficient value sub-blocks." The composite block QC shown in Fig. 2 includes different size sub-blocks with different size DCT coefficients. That composite block QC in Fig. 2 is not a 16 x 16 DCT calculated using 8 x 8 DCT coefficients. Rather, the QC block includes two 8 x 8 DCT sub-blocks, six 4 x 4 DCT sub-blocks, and eight 2 x 2 DCT sub-blocks. The QC composite block shown in Fig. 2 is not a DCT of length 16 x 16.

Claims 2, 11, 14, 16, and 19 do not recite a composite block made up of multiple, different-size, and distinct DCT sub-blocks. Rather, they require calculating a DCT of length N x N directly from four sequences of DCT coefficients of length N/2 x N/2. Using the Examiner's example, Lee does not teach calculating a DCT of length 16 x 16 directly from four sequences of DCT coefficients of length 8 x 8. Lee's invention is to select different size DCT sub-blocks to include in a composite block. But even if four 8 x 8 DCT sub-blocks were combined in Lee, which is unlikely in view of Lee's main objective, that composite block would not be a DCT of length 16 x 16. Rather, it would be four DCT sub-blocks of length 8 x 8.

Lacking features of claims 2, 11, 14, 16, and 19, the anticipation rejection is improper and should be reversed.

D. Lee and Zhu Fail to Disclose or Suggest Claims 22, 23, 25, and 26

Claim 22 recites "calculating DCTs for blocks of size N/2 x N/2," "collecting the extracted coeffiecient for four adjacent blocks of size N/2 x N/2," and "calculating, from the collected coefficient, coefficients of the DCTs for the blocks of size N x N using DCTs and IDCTs of the size N/2 x N/2 and without using DCTs or IDCTs of length N x N." This combination of features is just not taught in Lee for reasons explained above. Lee calculates different size/length DCTs and selects certain ones to include in a composite block. But Lee never combines a smaller size DCT block

to calculate a larger size DCT block. Lee also does not calculate N x N DCT coefficients for N x N size blocks using DCTs and IDCTs of length N/2 "*without using* DCTs or IDCTs of length N." To the contrary, Lee must use DCTs or IDCTs of length N to calculate N x N DCT coefficients for N x N size blocks.

The Examiner refers to column 4, line 9. Here Lee describes dividing pixel data "into an array of non-overlapping blocks, N x N in size." But Lee further goes on to disclose that a "two-dimensional N x N DCT is performed in each block." Column 4, lines 15-16. This text confirms that Lee does not combine a smaller size DCT block to calculate a larger size DCT block.

There is no teaching or motivation in Lee to support changing Lee to be like what is claimed. Lee is perfectly happy calculating a DCT of length N and assumes that there is DCT element of length N to perform an N-point DCT transform operation. In contrast, the present invention does not make that assumption.

As an example, if circuitry exists and/or it is desirable to perform 8 x 8 DCT transforms, the present invention provides a way to obtain DCTs for 16 x 16 pixel blocks from the 8 x 8 DCTs. A 16 x 16 DCT need not be used. This flexibility/capability is neither disclosed nor suggested in Lee. Nor does Lee explain how a DCT of length N x N may be calculated directly from four sequences of coefficients produced by calculating a DCT of length N/2 x N/2 without using DCTs of length N x N.

Calculating DCTs of length 8 x 8 for four 8 x 8 blocks that are obtained by dividing an original 16 x 16 pixel block is not the same as calculating a 16 x 16 DCT for the full block. The coefficients of the 16 x 16 DCT are not easily obtained from the coefficients of the 8 x 8 DCTs. As is apparent from the extensive mathematical explanation in the instant specification, it is rather tricky to obtain these 16 x 16 DCT coefficients from the coefficients of smaller block DCTs. There is no explanation in Lee of how such 16 x 16 DCT coefficients would be obtained from smaller size DCTs.

Regarding claim 23, Lee fails to teach and the Examiner fails to identify in Lee:

- collecting the extracted coefficients for four adjacent blocks of size N x N, the groups of four adjacent blocks forming together non-overlapping blocks of size 2N x 2N in the digitalized image;

- selecting, from the collected, extracted coefficients for each block of size N x N of each of the groups of four adjacent blocks of the size N x N, coefficients of N/2 x N/2 lowest frequencies;

- calculating, from the selected coefficients for each of the groups, coefficients of the DCT for a block of size N x N using DCTs and IDCTs of length N/2 and without using DCTs or IDCTs of length N or using DCTs and IDCTs for blocks of size N/2 x N/2 and without using DCTs or IDCTs of length N x N, and

- transmitting to the at least one user a bit stream including only the calculated coefficients.

Regarding claim 25, Lee fails to teach the claimed multi-node control unit comprising:

- means for receiving said bit stream from the second one of the users and for extracting from the bit stream coefficients for blocks of size N/2 x N/2 in a corresponding digitalized image;

- means for collecting the extracted coefficients for four adjacent blocks of size N/2 x N/2;

- means for calculating from the collected coefficients coefficients for a DCT for a block of size N x N using DCTs and IDCTs of length N/2 and without using DCTs or IDCTs of length N or using DCTs and IDCTs for blocks of size N/2 x N/2 and without using DCTs or IDCTs of length N x N;

- means for selecting, from the calculated coefficients, coefficients for the lowest frequencies, and

- means for transmitting to the first one of the users a bit stream including only the selected coefficients."

Regarding claim 26, Lee fails to teach the claimed multi-node control unit comprising:

- means for receiving said bit stream from the second one of the users and for extracting from the bit stream coefficients for blocks of size N x N in a corresponding digitalized image;

- means for collecting the extracted coefficients for four adjacent blocks of size N x N;

- means for selecting, from the extracted coefficients for each of the four adjacent blocks, coefficients for N/2 x N/2 lowest frequencies;

- means for calculating, from the selected coefficients, coefficients for a DCT for a block of size N x N using DCTs and IDCTs of length N/2 and without using DCTs or IDCTs of length N or using DCTs and IDCTs for blocks of size N/2 x N/2 and without using DCTs or IDCTs of length N x N; and

- means for transmitting to the first one of the users a bit stream including only the calculated coefficients."

The final rejection makes no attempt to identify any of these features from claims 22, 23, 25, and 26 in Lee or Zhu.

CONCLUSION

The rejected claims patentably distinguish from Lee alone and from Lee in combination with Zhu and are in condition for allowance. The Board is therefore requested to reverse the outstanding rejections.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: [signature]
John R. Lastova
Reg. No. 33,149

JRL:mm
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

APPENDIX A

CLAIMS ON APPEAL

2. An encoder or decoder comprising:

- first processing circuitry for calculating a discrete cosine transform (DCT) of length N/2 x N/2, N being a positive, even integer, to produce four sequences of coefficients, and

- second processing circuitry for calculating a DCT of length N x N directly from the four sequences of coefficients.

11. A method of encoding a digitalized image in a compressed discrete cosine transform (DCT) domain using DCTs of length N/2, comprising:

undersampling compressed frames by a certain factor in each dimension, and

calculating a DCT of length N x N directly from four adjacent DCT coefficient blocks of size N/2 x N/2 of the digitalized image, N being a positive, even integer.

14. The method of claim 11, wherein N is equal to 2^m, m being a positive integer > 0.

16. A method of decoding a digitalized image in the compressed discrete cosine transform (DCT) domain using DCTs of lengths N/2, comprising:

undersampling compressed frames by a certain factor in each dimension, and

calculating a DCT of length N x N directly from DCTs for four adjacent blocks of sizes N/2 x N/2 of the digitalized image, N being a positive, even integer.

19. A method of transcoding a digitalized image in the compressed discrete cosine transform (DCT) domain using DCTs of lengths N/2, comprising:

undersampling compressed frames by a certain factor in each dimension, and

calculating a DCT of length N x N directly from DCTs of length N/2 x N/2 for four adjacent blocks of size N/2 x N/2 of the digitalized image, N being a positive, even integer.

22. A method of transmitting a bit stream representing a digitalized image as a compressed video signal which includes coefficients obtained by calculating DCTs for blocks of size N/2 x N/2, the blocks being obtained by dividing the digitalized image, to a plurality of users, at least one of which requires a reduction of the bit stream or down-scaling of the corresponding compressed video signal, the method comprising:

receiving in a transcoder the bit stream of the compressed video signal;

extracting from the received bit stream the coefficients for the blocks of size N/2 x N/2;

collecting the extracted coefficients for four adjacent blocks of size N/2 x N/2, the groups of four adjacent blocks forming together non-overlapping blocks of size N x N in the digitalized image;

calculating, from the collected coefficients, coefficients of the DCTs for the blocks of size N x N using DCTs and IDCTs of length N/2 and without using DCTs or IDCTs of length N or using DCTs and IDCTs for blocks of the size N/2 x N/2 and without using DCTs or IDCTs of length N x N,

selecting, from the calculated coefficients, coefficients of the lowest frequencies; and

transmitting to the at least one user a bit stream including only the selected coefficients.

23. A method of transmitting a bit stream representing a digitalized image as a compressed video signal, which includes coefficients obtained by calculating DCTs for blocks of size N x N, the blocks being obtained by dividing the digitalized image, to a

plurality of users, at least one of which requires a reduction of the bit stream or down-scaling of the corresponding compressed video signal, the method comprising:

receiving in a transcoder the bit stream of the compressed video signal;

extracting, from the received bit stream, the coefficients for the blocks of size N x N;

collecting the extracted coefficients for four adjacent blocks of size N x N, the groups of four adjacent blocks forming together non-overlapping blocks of size 2N x 2N in the digitalized image;

selecting, from the collected, extracted coefficients for each block of size N x N of each of the groups of four adjacent blocks of the size N x N, coefficients of N/2 x N/2 lowest frequencies;

calculating, from the selected coefficients for each of the groups, coefficients of the DCT for a block of size N x N using DCTs and IDCTs of length N/2 and without using DCTs or IDCTs of length N or using DCTs and IDCTs for blocks of size N/2 x N/2 and without using DCTs or IDCTs of length N x N, and

transmitting to the at least one user a bit stream including only the calculated coefficients.

25. A transmission system for transmitting digitalized images where users are connected to each other through a multi-node control unit and bit streams of digitalized images corresponding to compressed video signals are transmitted between the users, the compressed video signal including coefficients obtained by calculating discrete cosine transforms (DCTs) for blocks of size N/2 x N/2 obtained by dividing the digitalized image,

- a first one of the users, for receiving a bit stream transmitted from a second one of the users, requiring a reduction of the bit stream or down-scaling of the corresponding compressed video signal,

the multi-node control unit comprising:

- means for receiving said bit stream from the second one of the users and for extracting from the bit stream coefficients for blocks of size N/2 x N/2 in a corresponding digitalized image;

- means for collecting the extracted coefficients for four adjacent blocks of size N/2 x N/2;

- means for calculating from the collected coefficients coefficients for a DCT for a block of size N x N using DCTs and IDCTs of length N/2 and without using DCTs or IDCTs of length N or using DCTs and IDCTs for blocks of size N/2 x N/2 and without using DCTs or IDCTs of length N x N;

- means for selecting, from the calculated coefficients, coefficients for the lowest frequencies, and

- means for transmitting to the first one of the users a bit stream including only the selected coefficients.

26. A transmission system for transmitting digitalized images, the system including users connected to each other through a multi-node control unit,

- bit streams of digitalized images being compressed video signals being transmitted between the users, the compressed video signal for a digitalized image comprising coefficients obtained by calculating DCTs for blocks of size N x N obtained by dividing the digitalized image,

- a first one of the users, for receiving a bit stream transmitted from a second one of the users, requiring a reduction of the bit stream or down-scaling of the corresponding compressed video signal,

the multi-node control unit comprising:

- means for receiving said bit stream from the second one of the users and for extracting from the bit stream coefficients for blocks of size N x N in a corresponding digitalized image;

- means for collecting the extracted coefficients for four adjacent blocks of size N x N;

- means for selecting, from the extracted coefficients for each of the four adjacent blocks, coefficients for N/2 x N/2 lowest frequencies;

- means for calculating, from the selected coefficients, coefficients for a DCT for a block of size N x N using DCTs and IDCTs of length N/2 and without using DCTs or IDCTs of length N or using DCTs and IDCTs for blocks of size N/2 x N/2 and without using DCTs or IDCTs of length N x N; and

- means for transmitting to the first one of the users a bit stream including only the calculated coefficients.